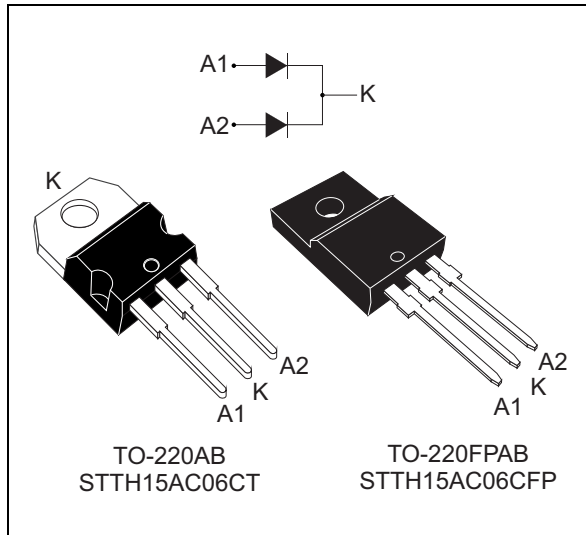


## Turbo 2 ultrafast high voltage rectifier

Datasheet – production data



### Description

The STTH15AC06C uses ST Turbo 2 600 V technology and is suited as a boost diode in air conditioning equipment for continuous mode interleaved power factor correction.

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 7.5 A
$V_{RRM}$	600 V
$t_{rr} (max)$	25 ns
$V_F (max)$	1.5 V
$T_j (max)$	175 °C

### Features

- Ultrafast switching
- Low reverse recovery current
- Reduces switching and conduction losses
- Low thermal resistance
- insulated package TO-220FPAB:
  - Insulated voltage: 2500 V<sub>DC</sub>

# 1 Characteristics

**Table 2. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current		15	A
$I_{F(AV)}$	Average forward current	Per diode	7.5	A
		Per device	15	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	80	A
$T_{stg}$	Storage temperature range		-65 to +175	°C
$T_j$	Maximum operating junction temperature		175	°C

**Table 3. Thermal parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (TO-220AB)	Per diode	2.8	°C/W
		Total	1.7	
	Coupling (TO-220AB)		0.6	
	Junction to case (TO-220FPAB)	Per diode	6	
		Total	4.5	
	Coupling (TO-220FPAB)		3	

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$			1	µA
		$T_j = 150$ °C			10	100	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	$I_F = 7.5$ A			1.9	V
		$T_j = 150$ °C			1.15	1.50	
		$T_j = 25$ °C	$I_F = 15$ A			2.2	
		$T_j = 150$ °C			1.4	1.8	

1. Pulse test:  $t_p = 5$  ms,  $\delta < 2\%$
2. Pulse test:  $t_p = 380$  µs,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.2 \times I_{F(AV)} + 0.04 I_{F(RMS)}^2$$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 0.5\text{ A}, I_{rr} = 0.25\text{ A}, I_R = 1\text{ A}$			25	ns
			$I_F = 1\text{ A}, V_R = 30\text{ V}, dI_F/dt = -50\text{ A}/\mu\text{s}$		35	50	
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ }^\circ\text{C}$	$I_F = 7.5\text{ A}, V_R = 400\text{ V}, dI_F/dt = -100\text{ A}/\mu\text{s}$		3.7	5	A
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 7.5\text{ A}, V_{FR} = 1.5\text{ V}, dI_F/dt = 100\text{ A}/\mu\text{s}$			100	ns
$V_{FP}$	Forward recovery voltage				2.5		V

Figure 1. Average forward power dissipation versus average forward current (per diode)

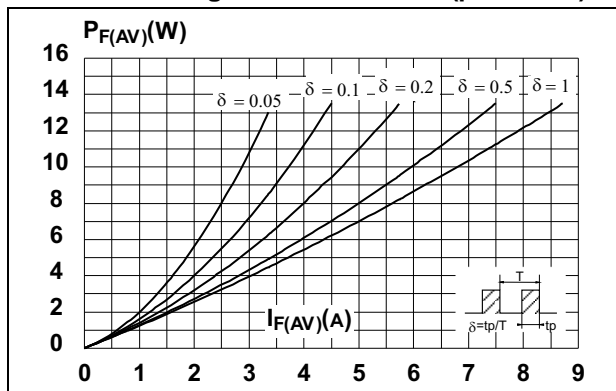


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

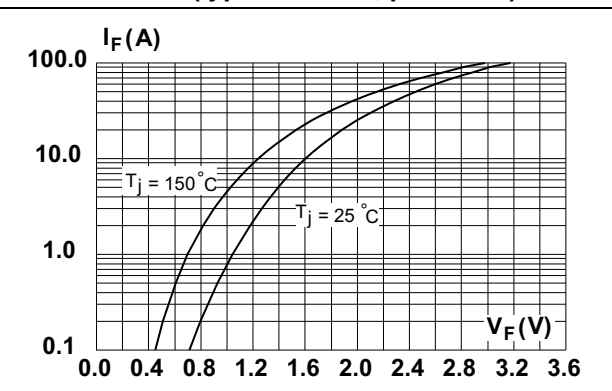


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

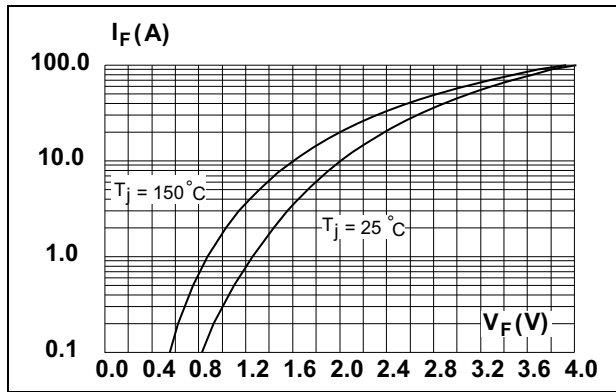


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220AB)

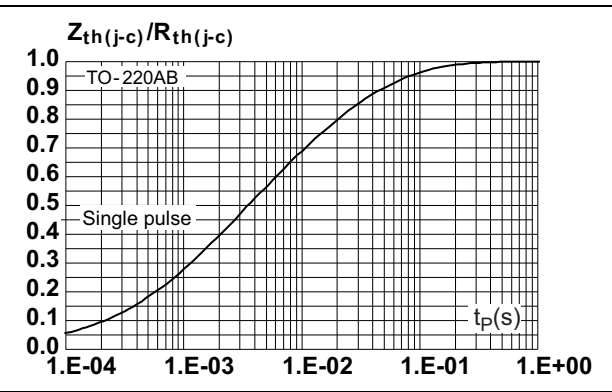


Figure 5. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220FPAB)

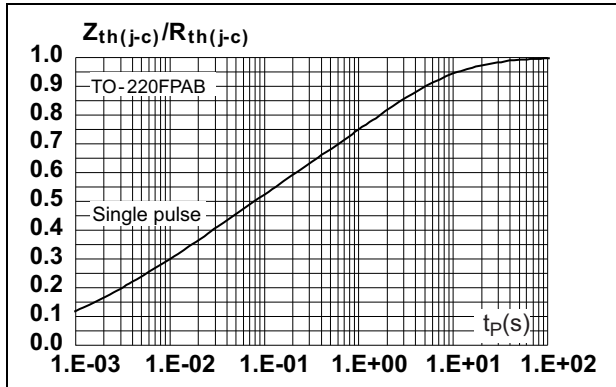


Figure 6. Peak reverse recovery versus  $di_F/dt$  (typical values, per diode)

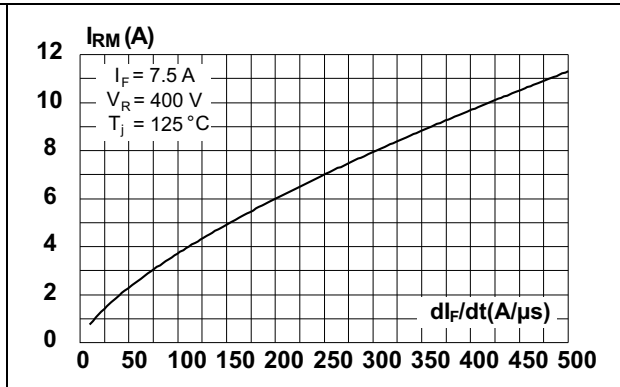


Figure 7. Reverse recovery time versus  $di_F/dt$  (typical values, per diode)

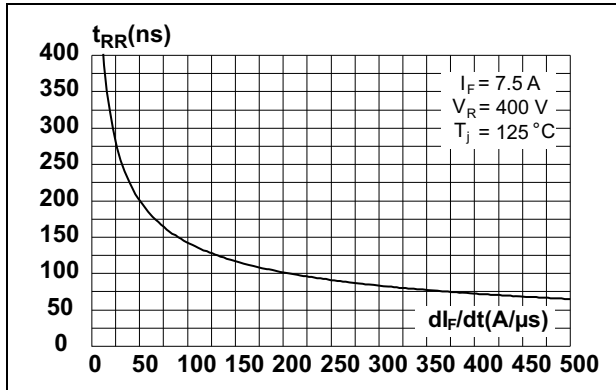


Figure 8. Reverse recovery charges versus  $di_F/dt$  (typical values, per diode)

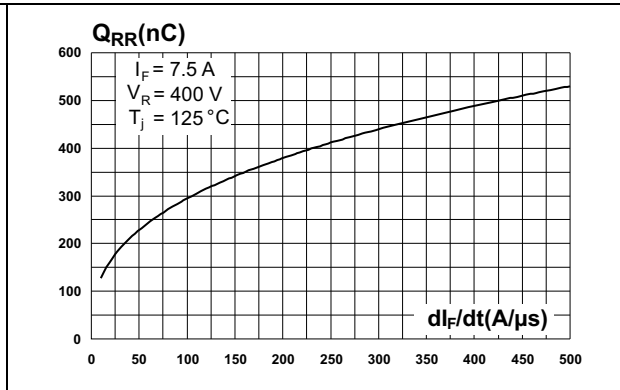


Figure 9. Reverse recovery softness factor versus  $di_F/dt$  (typical values, per diode)

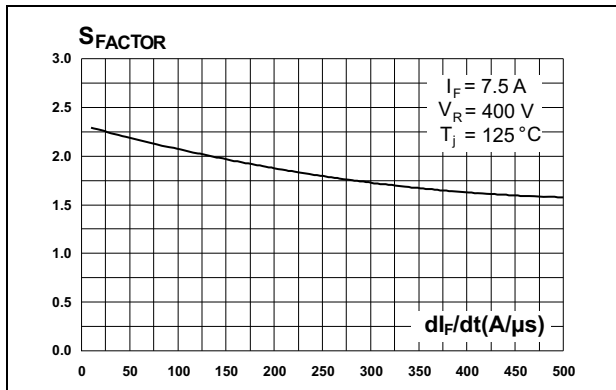


Figure 10. Relative variations of dynamic parameters versus junction temperature

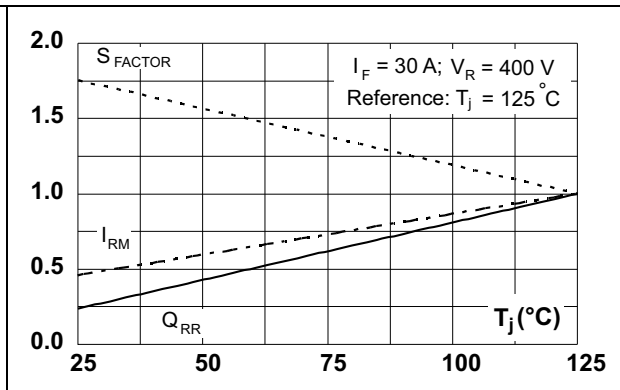


Figure 11. Transient peak forward voltage versus  $di_F/dt$  (typical values, per diode)

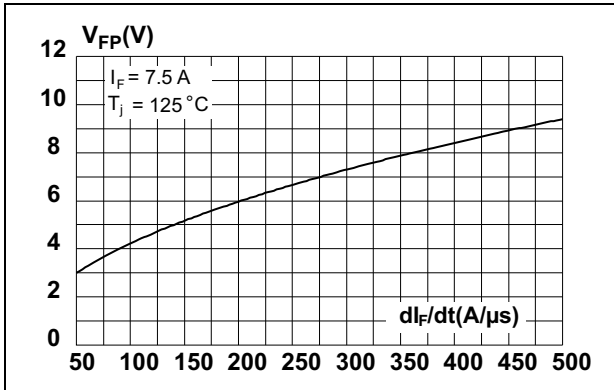


Figure 12. Forward recovery time versus  $di_F/dt$  (typical values, per diode)

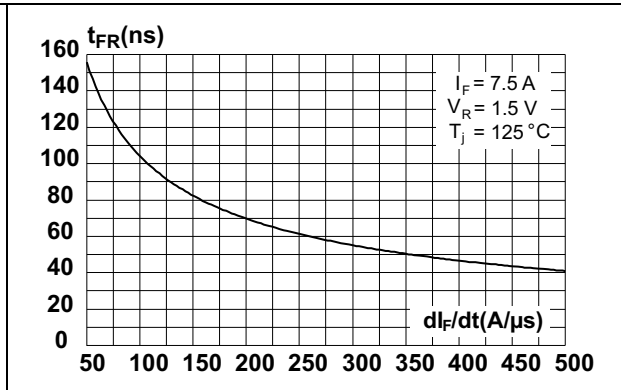
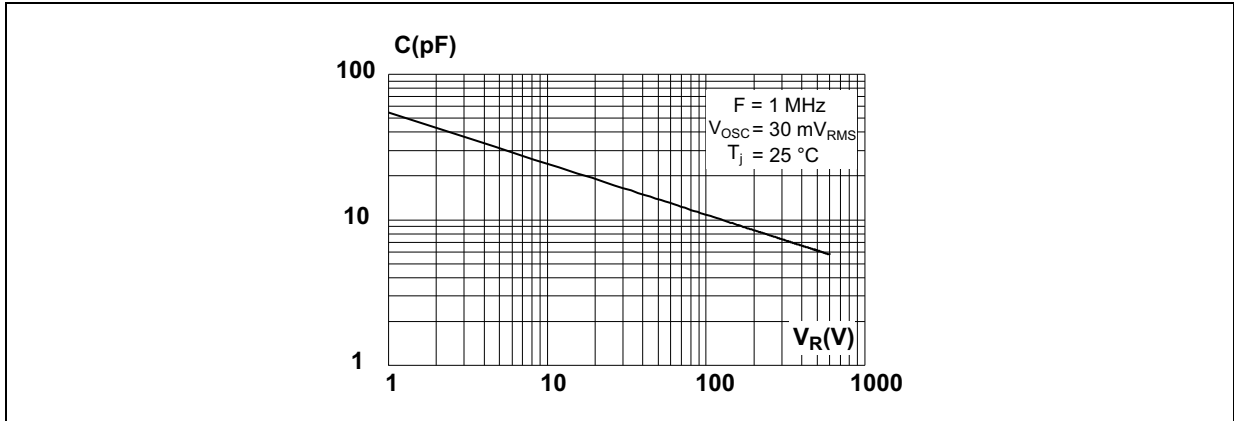


Figure 13. Junction capacitance versus reverse voltage applied (typical values, per diode)



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque: 0.4 to 0.6 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 14. TO220AB dimension definitions

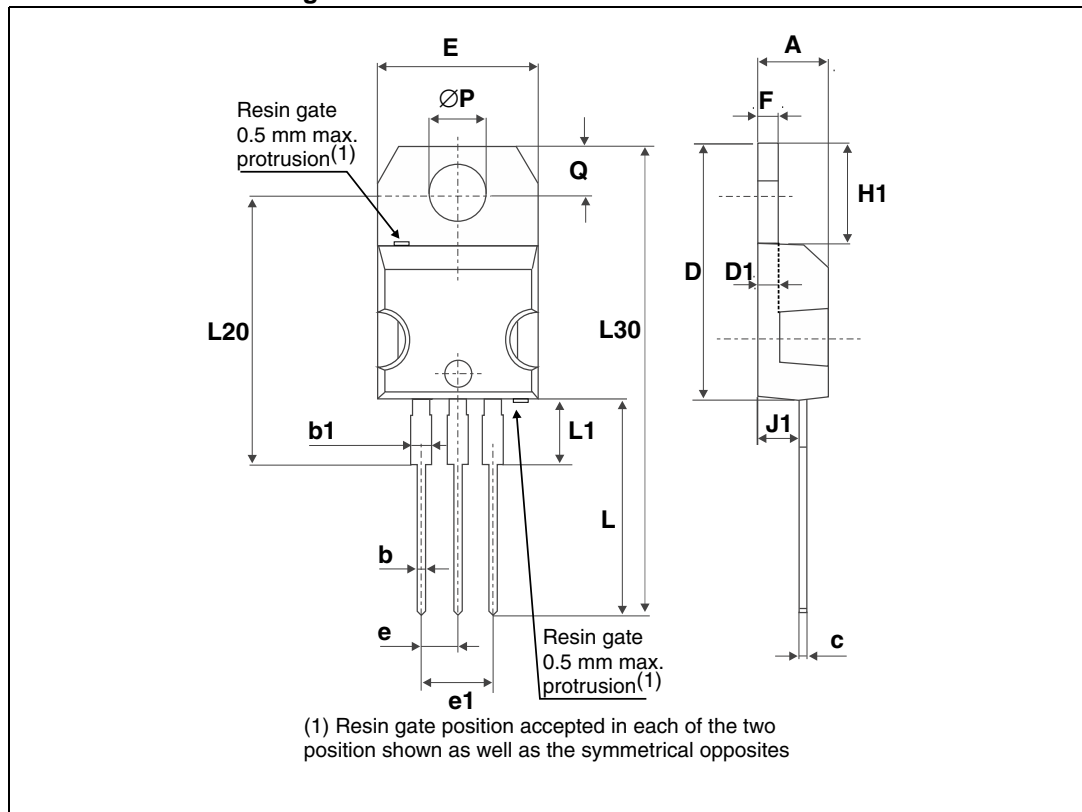


Table 6. TO220AB dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.17		0.18
b	0.61		0.88	0.024		0.035
b1	1.14		1.70	0.045		0.067
c	0.48		0.70	0.019		0.027
D	15.25		15.75	0.60		0.62
D1		1.27 typ			0.05 typ.	
E	10		10.40	0.39		0.41
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.19		0.20
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.24		0.26
J1	2.40		2.72	0.094		0.107
L	13		14	0.51		0.55
L1	3.50		3.93	0.137		0.154
L20		16.40 typ			0.64 typ.	
L30		28.90 typ			1.13 typ.	
ØP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

Figure 15. TO220FPAB dimension definitions

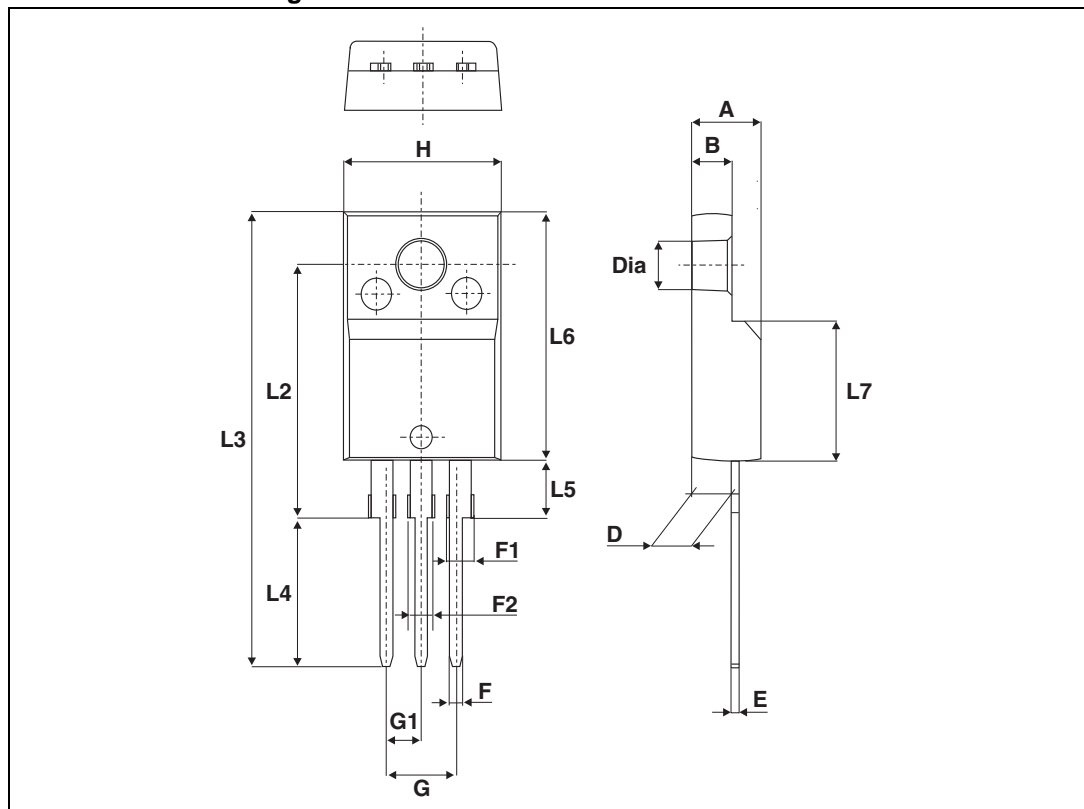




Table 7. T0-220FPAB dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.018		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.70	0.045		0.067
F2	1.15		1.70	0.045		0.067
G	4.95		5.20	0.195		0.205
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2	16 Typ.			0.63 Typ.		
L3	28.6		30.6	1.126		1.205
L4	9.8		10.6	0.386		0.417
L5	2.9		3.6	0.114		0.142
L6	15.9		16.4	0.626		0.646
L7	9.00		9.30	0.354		0.366
Dia.	3.00		3.20	0.118		0.126

### 3 Ordering information

**Table 8. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH15AC06CT	STTH15AC06CT	TO-220AB	1.9 g	50	Tube
STTH15AC06CFP	STTH15AC06CFP	TO-220FPAB	2.0 g	50	Tube

### 4 Revision history

**Table 9. Document revision history**

Date	Revision	Changes
21-Oct-2013	1	First release.

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